Minimizing impacts of invasive Spartina control on endangered California clapper rails

#0027

Technical Panel Review

Proposal Name: Minimizing impacts of invasive Spartina control on endangered California clapper rails

Applicant Organization: United States Geological Survey

Principal Lead Investigator(s):
Casazza, Michael
Strong, Donald
Takekawa, John

Amount Requested: $495,844

TSP Panel Summary of Findings:

This is generally a well-written proposal that will address an important concern regarding an "r" priority species, which is the short-term effect of removing invasive Spartina. As part of the proposed work, valuable information will be gathered regarding the population biology of this endangered subspecies. The need for the proposed work is clearly explained.

The authors show that there is an important yet poorly understood connection between the spread of the invasive cord grass and the occurance of the clapper rail. The author lays out several very realistic hypotheses and then proposes how to test each of them with the proposed study. The proposal gets high marks for its thorough design and innovative techniques, including radio tags on the clapper rails. The results obtained from the study will no doubt shed new light on the plant-bird connection and how the cord grass eradication might impact the future survivability of the clapper rail. The conceptual model does an outstanding job of tying the different proposal elements together. There is a concern with the proposal in that sorting out the experimental design is a challenge. The study design is not clearly explained, e.g., exactly how many plots/quadrants will fall under each objective is hard to decipher. Perhaps a simple table or chart might have worked to help the reviewers understand the

interconnections among the sampling/measurement programs and the six tasks. The conceptual model presented can suffice, but could have been better elaborated. Data collection is described but caveats and interpretation of data are not laid out. The investigators refrain from positing hypotheses at this time, but say that these will be developed later. The panel would have preferred that they either present the hypotheses now, to help judge the proposal, or state that hypothesis evaluation will not be part of the research protocol. The focus of this study is the main stem of San Francisco Bay yet the CalFED program has more interest in the Delta than the main stem.

The panel has the following recommendations: 1. Overall, although the panel rates this proposal as "above average", the focus of this study is the main stems of San Francisco Bay, whereas the CalFED program has more interest in the Delta ecosystem as opposed to the main stems. Clapper rails are not found in the Delta, nor is Spartina. In other words, this proposal, although important, is not specifically relevant to the Delta.

2. The product list refers to a spatially explicit population model, but this is not described in the Task-by-Task description.

Relevance to PSP Topic Areas:

Low

TSP Technical Rating:
Above Average

TSP Funding Recommendation:
Do Not Fund

TSP Amount Recommended: $**0**

Conditions:

External Technical Review #1

Proposal Title: Minimizing impacts of invasive Spartina control on endangered California clapper rails

Proposal Number: 0027

Proposal Applicant: United States Geological Survey

Purpose

Comments	**The project goals are clearly outlined. It's unclear how control of an invasive exotic plant species, Spartina, might impact recovery efforts for the endangered California clapper rail. Understanding rail ecology and demographics relative to Spartina use will help identify potential management conflicts and develop workable solutions. The current method of using call-response surveys to assess the impact of spartina control is entirely inadequate, all it tells you is how many calls were heard in the spartina control area. While you can compare that to what was heard prior to spartina control, you have no idea how any difference you detect might relate to overall health of the population. You need to know where missing birds may have gone, what was their survival rate and were they successful at finding and establishing other territories in the marsh. Given the current need for aggressive Spartina control and uncertainties about how rails will respond, the research is timely. A previous study sorted out the logistics of capturing and marking clapper rails, so a full study is justified. The authors frequently reference various types of hypotheses 'working', 'team', 'stackholder', but are not explicit. Several of the tasks do list fundamental ecological research hypotheses that are appropriate.**
Rating	**Superior**

Background

Comments	**A conceptual model is included. I found the background sufficient to understand both the need for the work and their proposed approach. I did think the text was not particularly effective at explaing the conceptual model depicted in figure 2. I might have suggested they include another figure that displayed the population model they planned to build, showing each parameter they needed to estimate, indicating parameter uncertainties and highlighting areas where demographic parameters might fluctuate as a consequence of spartina control. There is little demographic information for rails in the literature, so the values they propose to estimate are needed to develop their population model.**
Rating	**Sufficient**

Approach

Comments	**Project tasks are clearly separated into 'management and dissemination' and 'field research' areas. In the first case, there are plans for professional and public dissemination of information via professional journals, presentations, and web access. On the internet, information will be available at two already established and well maintained sites.** **Task 2 The authors mention power analysis, indicating they determined 30 birds were needed to detect 'moderate differences in movement and space use'. Defining 'moderate' would be helpful for assessing their proposed sample sizes. Also spliting their sample between control and treatment sites means n=15 for each group. This sample size leaves very little room for error (radio failures, lost birds, etc...). I understand the concern associated with working on an endangered species, but USFWS appears to support this project (letter of support included) so I suggest the PI's try to increase their sample. The long term gains**

	of marking additional birds FAR outweigh the potential costs to any captured bird or risk to the population. **What were the 5 'annual periods'? I interpreted it to mean 5 periods during the annual cycle.** **As all birds in a marsh will not be marked, it's not clear how they can test hypotheses relating to bird density and home range size or determine if displaced birds overlap territories with residents.** **Task 3 I don't understand how you will develop a predicted GIS rail distribution map. But I also don't see that it's needed given the research questions you have set out to answer** **Task 5 With n=30 you won't be able to include many covariables in your survival analysis, so really focus one the one or two you think are critical.** **Task 6 Using a BACI design to assess the impact of spartina control on rails requires multiple years pre−treatment and multiple years post−treatment. Thus, this 3−year project is not long enough to use this study design. However, I'd like to suggest an alternate approach. Why not build a habitat specific population model? This makes direct use of your habitat specific survival, movement, and reproductive estimates. Compared to the standard population model, you would add estimates for the probability that a bird in an eradication zone disperses following treatment, and their subsequent survival.**
Rating	**Above Average**

Feasibility

Comments	**The project is feasible. Given the the track record of the PI's and their long involvement with spartina and waterbird issues, the project has a high likelihood of success.**
Rating	

	Superior

Budget

Comments	**The proposed number and cost for telemetry receivers seems high. This may reflect the authors desire to deploy remote systems. However, it's not clear to what extent they will be useful or required. Some clarification would help. They request $25,500 for a 'voluteer' technician, clarification is needed.**
Rating	**Sufficient**

Relevance To CALFED

Comments	**The proposal specifically addresses 2 CALFED research priority topics. Their use of modeling and proposed synthesis of rail ecology data with existing and planned spartina control projects. Results will directly contribute to facilitating spartina control efforts and understanding their consequences to a T bird species in SF Bay.**
Rating	**Above Average**

Qualifications

Comments	**The research team is clearly qualified to successfully carry out the project. Casazza, Takekawa, and Overton all have experience with telemetry and wetland birds, including clapper rails (Takekawa) and Strong has a long history of working with Spartina issues in the San Francisco Bay.**
Rating	**Superior**

Overall Evaluation Summary Rating

Comments	**Spartina invasion in SF Bay is one of the greatest ecological threats to the function of the ecosystem. In part, spartina control is being hampered by concerns about the California**

	clapper rail. This project will be the first to measure important demographic parameters that provide a biologically realistic understanding of how rails respond to, and may or may not be affected by, spartina control. In the absence of such information, it's not clear if mitigation efforts for rails are needed, or what they should be if needed.
Rating	**Superior**

External Technical Review #2

Proposal Title: Minimizing impacts of invasive Spartina control on endangered California clapper rails

Proposal Number: 0027

Proposal Applicant: United States Geological Survey

Purpose

Comments	**The goal of the project is to determine the effect of Spartina and its control on the clapper rail and to recommend control strategies that minimize negative impact. The goals and objectives are clearly stated. It is timely and important in light of the increasing invasion of Spartina.** **At the start of my reading of the proposal I had the question of what came first in South Bay – the high numbers of clapper rails or the invasive Spartina. It would be nice to know if the numbers increased or decreased following the invasion. I didn't find that question answered in the proposal. Had clapper rail usage before invasion not been determined?**
Rating	**Above Average**

Background

Comments	**The conceptual model and ideas are fine. Its an interesting problem since removing Spartina could actually negatively impact the clapper rail.**
Rating	**Above Average**

Approach

Comments	**I like the idea of the use of paired marshes to study movement etc. However, it was confusing as to what exactly was going to be done – it said that there**

would be 6 total marshes and they would use paired marshes so that makes 3 pairs (5 marked rails in each to total 30 rails). At least 2 marshes are to be chosen from the three listed which had large areas of invasive Spartina. It then said the remaining site(s) will include lower eradication effort etc. And then it said they would include one pair that will include an invasive site with an un-invaded marsh. So it seems like more than three pairs to me. It seems like the first question to answer is what effect does the invasive Spartina have on the clapper rail and secondly then what are the effects of controlling the Spartina. The proposal states, as do each of the four support letters, that only one study, an unpublished master's thesis, conducted a decade ago examined movements of the clapper rail within the marsh. So, apparently the need is there and I doubt that one marsh pair is sufficient from which to draw reliable conclusions on the effects of Spartina invasion on clapper rail movement etc. In order to meet their objectives, it would be better if they could have three marsh pairs of the invaded vs. uninvaded and three of the treated vs. untreated. And then if they want to look at multiple levels of Spartina invasion and of rail density they would need more marshes. This would avoid any pseudoreplication criticism. If that is not possible then it should have been explained why and how they would deal with that. Also, what is in the uninvaded area? Is it Spartina foliosa, mudflat, other plants, or a combination of all these? In the treated marshes, how much Spartina has been eradicated and in those areas where it has been eradicated what is there now? In the untreated marshes where there is invasive Spartina, what else occupies the marsh or is it a monospecific stand of invasive Spartina?

How is the Spartina controlled? I assume by spraying with glyphosate herbicide?

Under Task 3, it is stated that field measurements will be made using 1 m2 quadrats and transects. The

	first two papers they cite for the methods for collecting these measurements I didn't have access to; the third I could access the website given but where it talked about measuring plant height it just said they counted those under and those over 30 cm. In light of Zedler's work on canopy architecture for the clapper rail indicating a need of plants over 60 cm and some proportion over 90 cm in height for nesting, along with a density of 100 stems per m2, it would have been good to elaborate on the data collection for these variables so as to make the reader realize that the authors were aware of this information. **The investigators have a good plan for dissemination of the project results. The administration of the project and who performs the tasks are clearly stated.**
Rating	**Sufficient**

Feasibility

Comments	**My concern is relative to what I wrote under Approach, i.e. whether enough marshes of the different types are being sampled. On p. 5, under Approach and Scope of Work, the proposal states they will look at two rail densities and three levels of Spartina eradication. But when I look at the individual Task descriptions I don't see this level of detail. For example, under Task 2 there are only 3 marsh pairs being studied. For this reason I doubt that they can really satisfy their goals of recommending specific control strategies for minimizing control impacts and of reliably quantifying the impact of invasive Spartina or its control.** **The ideas are good and I believe would provide valuable information if enough sampling is done. It may be that the funds would be better spent on more marshes sampled to get a reliable handle on the effects of invasive Spartina and on its control rather than on the modeling efforts. The models are only as good as the numbers going into them.**
Rating	

	Sufficient

Budget

Comments	**The budget is clear and reasonable, but as stated under Feasibility may result in better data and therefore better conclusions if restructured to spend more on field sampling and less on modeling.**
Rating	**Above Average**

Relevance To CALFED

Comments	**The proposal addresses two research priorities in the PSP and also modelling. If adequate sampling data can be derived from the project it will be very useful.**
Rating	**Above Average**

Qualifications

Comments	**The lead author appears to have the qualifications necessary to lead the project. Strong has expertise in Spartina invasion and hybridization. Takekawa has the needed expertise in radio telemetry. The other individuals on the project appear to be qualified for their tasks.**
Rating	**Superior**

Overall Evaluation Summary Rating

Comments	**I would rate it between sufficient and above average. What they are doing is good, but to meet objectives they need field sampling in more marshes of the various marsh types. I would suggest expanding the field sampling and saving the modelling for a later proposal.**
Rating	**Above Average**

External Technical Review #3

Proposal Title: Minimizing impacts of invasive Spartina control on endangered California clapper rails

Proposal Number: 0027

Proposal Applicant: United States Geological Survey

Purpose

Comments	**This is a well written proposal where the goals, objectives, and hypotheses are clearly stated. The study, to look at the potential impact on Clapper Rails of controlling the invasive Spartina plant in San Francisco Bay, is a timely one since the non-native Spartina is rapidly spreading in SF Bay with unknown consequences for local bird populations. The Clapper Rail is a federally listed species and yet little is known about its population dynamics within the bay or its relationship with the invasive Spartina. As such, this study is well justified and likely to generate important baseline information and possibly important management information.**
Rating	**Superior**

Background

Comments	**A conceptual model is clearly stated (at least as clearly stated that conceptual models ever are to me), and it outlines the basis for the proposed work. It shows the connections between Spartina spread and control with the biotic and abiotic factors influencing the demography of the Clapper Rail. The background information is well documented and provides a justifiable basis for the study.**
Rating	**Above Average**

Approach

Comments	**I like the approach of using radiotelemetry with habitat modeling to look at this issue of the effects of Spartina and its control on Clapper Rail life history variables. If no problems occur with the capturing and tagging these animals, the data provided will be invaluable. Management of the project is fairly clear, and the academic (UC Davis) and federal (USGS) collaboration is a strong one. As such, the likelihood of valuable products coming from this collaboration is strong. Effective dissemination of products will be likely through web pages and publications. Furthermore, both groups are experienced when it comes to larger data management system issues.**
Rating	**Superior**

Feasibility

Comments	**Given permit issues with marking endangered Clapper Rails, sample sizes (30 individuals radiomarked per year) will be on the low side for getting statistical answers to some of the questions and hypotheses being posed. This is especially true in that undoubtedly there will be radio problems. However, the USGS team is very well equipped to handle these issues and I think that they have a high chance for success. The scale of the project is consistent with the objectives and certainly within grasp of the investigators.**
Rating	**Above Average**

Budget

Comments	**The budget appears to be reasonable and given some of the in-kind contributions a deal. One can quibble with the 42% overhead rate, but with the other in-kind support it does not seem excessive.**
Rating	**Above Average**

Relevance To CALFED

Comments	**While work in south San Francisco Bay has not traditionally been a CALFED priority, the proposal addresses two of the priority research topics in the PSP: 1) Invasive aquatic species, and 2) Habitat availability and response to change. Some integration of of information will also occur given the extensive background of these PIs in bird issues of San Francisco Bay and invasive Spartina issues. I think that the information generated with result in the best available data for managers and policy people to turn to in deciding how to treat Spartina while minimizing impacts on the SF Bay Clapper Rail population. Since Clapper Rails are a listed species this is a highly relevant topic to elucidate if Spartina control is to proceed in a timely fashion.**
Rating	**Above Average**

Qualifications

Comments	**This is a well qualified team to tackle this issue. Both groups, USGS and UC Davis, have long worked on SF Bay issues, both groups have excellent publication records, and USGS has complete expertise in radiotelemetry issues. The necessary infrastructure is there to do this study well.**
Rating	**Superior**

Overall Evaluation Summary Rating

Comments	**This is a well written and thought out proposal on an extremely timely issue for San Francisco Bay. The team assembled to do the work has already proven its ability to do this type of study, analyze the data, and synthesize the results for interested parties. I feel that it is a high priority study even though this is basically a single species study. For these reasons I rate it between a superior and above average proposal.**

External Technical Review #3

Rating	**Above Average**